
सिरैमिक टाइलें — परिक्षण पद्धतियां,
नमूने लेने तथा स्वीकार्यता का आधार

भाग 3 उबलता पानी प्रयोग करते हुए
नमी विस्तार ज्ञात करना

(दूसरा पुनरीक्षण)

**Ceramic Tiles — Methods of Test,
Sampling and Basis for Acceptance**

**Part 3 Determination of Moisture
Expansion Using Boiling Water**

(*Second Revision*)

ICS 91.100.23

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FOREWORD

This Indian Standard (Part 3) (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Flooring, Wall Finishing and Roofing Sectional Committee had been approved by the Civil Engineering Division Council.

This standard (Part 3) was first published in 1992 and subsequently revised in 2006. This second revision incorporates the experience gained with the use of this standard and brings the standard in line with the latest developments in this field.

The following are the significant modifications incorporated in this revision:

- a) The title has been changed so as to make the test applicable for both glazed and unglazed tiles;
- b) Kiln description has been added; and
- c) Sample size has been reduced.

This Indian Standard is published in several parts. The other parts in this series are:

- Part 1 Determination of dimensions and surface quality
- Part 2 Determination of water absorption and bulk density
- Part 4 Determination of linear thermal expansion
- Part 5 Determination of resistance to thermal shock
- Part 6 Determination of modulus of rupture and breaking strength
- Part 7 Determination of stain and chemical resistance of unglazed tiles
- Part 8 Determination of stain and chemical resistance of glazed tiles
- Part 9 Determination of crazing resistance of glazed tiles
- Part 10 Determination of frost resistance
- Part 11 Determination of resistance to surface abrasion of glazed tiles
- Part 12 Determination of resistance to deep abrasion of unglazed tiles
- Part 13 Determination of scratch hardness of surface according to Mohs' scale
- Part 14 Determination of impact resistance by measurement of coefficient of restitution
- Part 15 Sampling and basis for acceptance
- Part 16 Determinations of lead and cadmium given off by glazed tiles

In the formulation of this standard considerable assistance has been derived from the ISO 10545-10 : 1995 'Ceramic tiles — Part 10: Determination of moisture expansion'.

The composition of the Committee responsible for the formulation of this standard is given in Annex A.

In reporting the results of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'.

*Indian Standard***CERAMIC TILES — METHODS OF TEST,
SAMPLING AND BASIS FOR ACCEPTANCE****PART 3 DETERMINATION OF MOISTURE EXPANSION
USING BOILING WATER***(Second Revision)***1 SCOPE**

This standard (Part 3) covers methods of test for determining the moisture expansion of both glazed and unglazed ceramic tiles.

2 TERMINOLOGY

For the purpose of this standard, the following definition shall apply.

2.1 Moisture Expansion Using Boiling Water

The difference between the means of measurements made on test specimens before and after subjecting them to boiling water. It is expressed as l/L , where l is the expansion after treatment in boiling water and L is the initial length.

3 APPARATUS

3.1 Direct reading gauge with a minimum travel of 10 mm and an accuracy of at least 0.01 mm.

3.2 Reference bars of nickel steel (invar) of the approximate lengths of the test specimens.

3.3 Kiln, capable of firing up to 600 °C, at a rate of temperature rise of 150 °C/h and with a control over the temperature of ± 15 °C.

3.4 Vernier calipers or other suitable apparatus, for linear measurement to the nearest 0.1 mm.

3.5 An apparatus for maintaining the specimens in boiling water for 24 h.

4 TEST SPECIMENS

4.1 Sample for each type of tile under test shall consist of five whole tiles. Cut a test specimen from the centre of each tile of the greatest possible length of up to 100 mm with a minimum width of 35 mm and the thickness that of the tile.

4.2 In the case of extruded tile the length of the test specimens shall be in the direction of the extrusion.

4.3 Prepare the ends of the test specimens as required for the adopted measuring device.

5 PROCEDURE**5.1 Refiring**

5.1.1 If the test specimens become wet during cutting, keep them for 24 h at room temperature.

5.1.2 Refire the test specimens in a kiln, with a temperature rise of 150 °C/h and a 2 h soak at 550 ± 15 °C.

5.1.3 Allow the test specimens to cool inside the kiln for at least 20 h, remove them when the temperature falls to 70 ± 10 °C and then keep them at room temperature for at least 24 h to 32 h in a desiccator.

5.1.4 Measure the test specimens twice with 3 h between measurements.

5.1.5 Record the length of each test specimen relative to the length of the invar reference bar in order to eliminate possible variations of the measuring apparatus.

5.1.6 Determine the initial length of each test specimen to the nearest 0.5 mm.

5.2 Boiling Water Treatment

5.2.1 Immerse the test specimens in boiling water for 24 h consecutively, ensuring that there is at least 50 mm height of water above and the test specimen do not touch each other or touch the base and sides.

5.2.2 Remove the test specimens and allow them to cool at room temperature, measure them after 1 h and again after a further 3 h.

5.2.3 Record the measurement as in 5.1.

6 EXPRESSION OF RESULTS

6.1 For each test specimens determine the mean of the two measurements prior to treatment in boiling water, the mean of the two measurements after boiling water treatment and then determine the difference between the two mean values.

6.2 The moisture expansion, in mm/m is calculated from $l/L \times 1\,000$.

7 TEST REPORT

The test report shall contain the following:

- a) Description of the tiles; and
- b) Moisture expansion of each test specimen.

ANNEX A

(Foreword)

COMMITTEE COMPOSITION

Flooring, Wall Finishing and Roofing Sectional Committee, CED 05

<i>Organization</i>	<i>Representative(s)</i>
In Personal Capacity (<i>L/109, Sarita Vihar, New Delhi</i>)	SHRI ASHOK KHURANA (Chairman)
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